Notes 12.5 – Modeling with Exponentials

$$f(x) = a \cdot b^{x}$$

x ← how many times / when

a ↙ initial amount

b ↘ what's happening to the initial amount

Percent Growth + Decay

b {

- Always start from 100% and then add or subtract your % growth or decay
- Always turn your % into a decimal
  - ↳ divide by 100 / move the decimal two spaces left

- Growth $b > 1$, $100\% + \%$ growth "appreciates"
- Decay $0 < b < 1$ $100\% - \%$ decay "depreciate"

Ex 1: A house worth \$120,000 is depreciating in value 6% each year.

A. Write an equation to model this.

B. How much will the house be worth in 10 years?

A. $a = 120{,}000$ b. $100\% - 6\% = 94\% \Rightarrow 0.94$

$$f(x) = 120{,}000(0.94)^{x} \quad x = \#\text{ years}$$

B. $f(10) = 120{,}000(0.94)^{10}$

$= \$64{,}633.81$

Ex 2: A pet store starts with 10 fish that double in population every 4 months.

A. Write an equation to model the # of fish after M months.

B. How many fish will they have after one year?

A. $a = 10 \quad b = 2$

$$f(M) = 10(2)^{\frac{M}{4}}$$

B. $f(12) = 10(2)^{\frac{12}{4}}$

12 months in 1 year

$= 10(2)^3 = 10(8) = 80$ fish